History of Supplemental Instruction (SI): Mainstreaming of Developmental Education

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Abstract

Postsecondary institutions throughout the nation's history have provided developmental education and learning assistance programs to meet the academic standards expected of admitted college students. This history of developmental education provides a context for creation of the Supplemental Instruction (SI) model in 1973 at the University of Missouri-Kansas City to meet immediate needs at the institution due to a high attrition rate among students enrolled in professional schools. The national, and eventual international, dissemination of the SI model was due to it meeting similar needs at other institutions as well. SI has become a widely adopted method of mainstreaming the best practices of developmental education with college-level courses.

Origins of Supplemental Instruction

It is important to understanding the historic relationship of Supplemental Instruction (SI) to other forms of academic assistance and enrichment for students. A review of this U. S. Higher education history since the mid 1600s provides a framework to place SI within the broader context. "It can be asserted accurately that bridging the academic preparation gap has been a constant in the history of American higher education and that the controversy surrounding it is an American educational tradition" (Brier, 1984, p. 2).

The six phases of developmental education (Arendale, 2000) in American history are naturally interconnected with the social history that surrounds and interacts with them. Each resulting historical phase has included more student subpopulations that need support in higher education through developmental education. Degler observed that social change is more likely to occur as a practical response to specific events rather than as the implementation of a well-developed ideology (Degler in Chafe, 1991, p. 172). Major events such as world wars, major migrations of people, economic trends, and federal legislation will play important roles with helping to foster changes in postsecondary education. These currents of history will also naturally affect developmental education as it adapts to meet immediate needs and survives the political forces that will war against its existence. Developmental education expanded its service to more students not due to an intelligent plan, but as a natural response to growing needs by an increasingly diverse heterogeneous college student body. Within this context Supplemental Instruction would be created later in the twentieth century. For purposes of this study of the history of Supplemental Instruction, the fifth phase of developmental education history (i.e., Early 1970s to Mid 1990s) will be explored.

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Developmental Education and Learning Assistance Centers

The predominant term of choice of many who work within the profession beginning in the 1970s has been "developmental education," borrowed from the field of college student personnel. Developmental education is more comprehensive regarding the student and focuses on development of the person through both the academic and social domains (Casazza & Silverman, 1996). Rather than focusing on student deficits, developmental education assumes that each student has talents that can be developed beyond dealing with improving weak skill areas. Developmental education assumes that all students are "developmental" and can grow in multiple dimensions of their academic skills. "The notion of developmental sequence is the kingpin of developmental theory . . . A goal of education is to stimulate the individual to move to the next stage in the sequence" (Cross, 1976, p. 158). Many similarities exist among the goals of developmental education and those of lifelong learning.

In the early 1970s a new manifestation of developmental education was the introduction of the Learning Assistance Center (Carman, 1970; Christ, 1971; Ellison, 1973). Many in the developmental education field credit Professor Frank Christ at California State University-Long Beach for being the first to use the term in the professional literature and developing the first Learning Assistance Center (LAC), then called the Learning Assistance Support System (Christ, 1997). White and Schnuth (1990, p. 157) noted that a distinguishing characteristic of LACs is their comprehensive nature and mission within the institution. Rather than focusing on a subpopulation of underprepared students, LACs extended their services for all students and faculty members. The center was seen as a natural extension of the classroom with enrichment activities for all students, not just those with a history of academic under performance.

Christ (1971) stated that these LACs had six purposes: higher course grades for participating students; central location for students to receive tutorial assistance; a referral source to other helping agencies; a comprehensive library of basic study aids; a training agency for paraprofessionals, peer counselors, and tutors; and a center for faculty development. This last feature of serving as a venue for faculty development is unique in comparison with previous remedial and developmental education programs:

> A Learning Assistance Center will be any place where learners, learner data, and learning facilitators are interwoven into a sequential, cybernetic, individualized, people-oriented system to service all students (learners) and faculty (learning facilitators) of any institution for whom LEARNING by its students is important. (Christ, 1971, p. 39)

LACs, according to Christ, were much more comprehensive in terms of theoretical underpinnings and the services that they provided in comparison with earlier reading labs and other forms of academic assistance:

> [LACs] differed significantly from previous academic support services by introducing concepts and strategies from human development, the psychology

of learning, educational technology, and corporate management into an operational rationale specific to higher education; by functioning as a campus-wide support system in a centralized operational facility; by vigorously opposing any stigma that it was "remedial" and only for inadequately prepared, provisionally admitted, or probationary students; and by emphasizing "management by objectives" and a cybernetic subsystem of ongoing evaluation to elicit and use feedback from users for constant program modification. (Christ, 1997, pp. 1-2)

LACs, and later Supplemental Instruction, benefitted from this focus on avoiding the remedial label for their services. Community colleges during this time warmly embraced remedial education because they viewed it as a primary mission for their institutions and a source of state financial support. Legislative leaders sought to differentiate institutional missions among types of higher education colleges and universities. It was difficult for public four-year institutions to receive state appropriations to fund expansive remedial courses. However, learning enrichment services offered to all students at four-year institutions were politically acceptable to most institutional and state-level policy makers.

Various factors encouraged the rapid development of these LACs among postsecondary institutions: application of technology for individualized learning; response to lowered admission standards; focus on cognitive learning strategies; use as a program to increase student retention; and provision of learning enrichment environment for all students, despite the previous level of academic performance (Enright, 1975). The LAC was viewed as a catalyst for improved learning across the campus. Rather than continuing the previous practice of preparatory programs and remedial courses that were often outside the heart of the college, these centers were central to the institutional mission (Hultgren, 1970; Kerstiens, 1972). Faculty members often recognize these centers as extensions of the classroom and for deeper mastery of the college-level content material. "The resource center does not define the goals of the learning it supports; it accepts the goals of the faculty and the students" (Henderson, Melloni, & Sherman, 1971, p. 5). It was common for an LAC to be a consolidated and centralized operation that was housed in a single location on campus. White, Kyzar, and Lane (1990, p. 185-189) reviewed the common space requirements for LACs. Because of the variety of services provided by the centers, extensive space was necessary to house tutorial areas, classrooms, computer labs, staff offices, curriculum materials, and other spaces.

Lissner (1990, pp. 132-133) states that LACs were the natural evolution of the various student support programs that were created after the Civil Rights legislation of the 1960s. Integration of various components was required to bring together instructional media centers, writing centers, reading laboratories, study skill centers, and individual audio tape tutorial centers. Many of these activities were supported by grants awarded during the previous decade; therefore, it was necessary for the colleges to institutionalize or eliminate the components. Coherence was brought to the various activities through a common philosophy.

A major departure of the mission of the LACs was to embrace the enrichment and development of all students on campus, not just the smaller number who were the least academically prepared and needed remedial assistance. Individual student interventions and course-related services were both provided.

Historical Development of Supplemental Instruction (SI)

Supplemental Instruction (SI) was created at the University of Missouri-Kansas City (UMKC) in 1973 as a response to a need at the institution created by a dramatic change in the demographics of the student body and a sudden rise in student attrition. UMKC was formerly the University of Kansas City (UKC), a small, private university founded in 1930. While UKC was in an urban area, its private status only permitted academically well-prepared students to be admitted. In the early 1960s UKC fell upon hard financial times and made itself available for purchase by the State of Missouri. After the University of Missouri system purchased UKC in 1963, there was a dramatic change in the student body. Besides reducing the academic selectivity of the student body, the institution quickly grew through the acquisition of independent professional schools of law, dentistry, pharmacy, and a conservatory of music. While the undergraduate body had a lower level of previous academic achievement than before due to the less selective admissions criteria, the same faculty who had high academic expectations for students from the UKC era continued to teach at the institution. As a direct result of a growing mismatch between faculty academic expectancy and student academic capability, attrition at the institution quickly increased from 20% to 45% (Widmar, 1994).

Rather than choosing the traditional course taken by many institutions during the early 1970s to offer remedial classes or provide a centralized LAC, UMKC chose another course. Well before the trend in some areas of the country during the 1990s that have prohibited developmental or remedial education courses at public four-year institutions, the University of Missouri system had already prohibited such courses in the 1970s. Another delivery system for learning assistance and developmental education was required to meet student and institutional needs.

Gary Widmar, Chief Student Affairs Officer, hired Deanna Martin, a then doctoral student in reading education, in 1972 to work on a $7,000 grant from the Greater Kansas City Association of Trusts and Foundation to solve the attrition problem among minority professional school students in medicine, pharmacy, and dentistry. Martin used her knowledge from her recent graduate studies along with a national survey of learning center directors to identify common concerns with traditional approaches to helping students: services were ancillary to the institution; standardized tests were insufficient to predict students that needed assistance; services were often provided too late for help to students; students did not have time nor money to enroll in additional developmental courses; students displayed difficulty in transferring study strategies to the academic

content courses; individual tutoring was expensive; students often did not avail themselves of services for fear of being stigmatized; and evaluation of learning services was inadequate (Widmar, 1994, pp. 4-5).

The need for a different approach was presented in 1972 when an apparent paradox was encountered at UMKC, namely how to reduce student attrition when there is negligible funding for creation of a comprehensive LAC and the faculty will permit neither remedial nor developmental coursework? This was the paradox created by the University of Missouri-Kansas City university-wide retention committee in 1972. Although members of the university-wide retention committee were keenly interested in improving student persistence, resources were scarce. Faculty members on the committee argued that any available funding should go directly into the departmental budgets because they were the ones who had regular, sustained contact with the students in the classrooms. Generally, faculty believed they were best equipped by training, by intellect, and by academic commitment to meet student needs. Administration countered by pointing out that giving departments funding for teaching improvements and tutoring had proved unproductive; attrition statistics remained appallingly high. The faculty parried by arguing that if administration would only recruit better students, the discussion would be moot. The committee's only area of agreement was on the need to evaluate rigorously any future effort to support student learning on the campus.

Deanna Martin proposed a plan that appealed to the UMKC retention committee on several grounds. First, SI as she proposed it, could be evaluated in terms of reduced attrition and grade improvement in core curriculum courses. If the percentages of top grades rose in courses where SI was provided, and if D and F grades and Withdrawals fell, it might be reasonable to infer that SI had made a difference in an otherwise stable course. Secondly, the committee suggested controlling for several potentially confounding variables: motivation, professor, type of test, text, grading standards, and various academic and demographic factors. Thirdly, the committee wished to avoid an implication that student support was remedial. They recognized that SI would not be perceived in those ways if the SI program in each course began well before the first examination scores were recorded and if SI were open to all students in the class on a voluntary basis. Fourthly, faculty were attracted to SI because of the small fiscal commitment to the pilot program and because it required a minimum of faculty time. Finally, they liked the idea that SI would promote independent learning by the students.

Martin successfully pilot tested what would become Supplemental Instruction in 1973 during a human anatomy class at the UMKC School of Dentistry. Additional grant support was gained from the U.S. Department of Education (USDOE) Health Careers Opportunity Program ($447,685 funded from 1976 to 1980) and Greater Kansas City Association of Trusts and Foundations ($180,000 funded from 1977 to 1979) to expand the SI program. With this significant financial support, SI was used successfully in a variety of courses in the professional schools of dentistry, pharmacy, and medicine. The

SI program was then implemented at the undergraduate level in 1981 after its success with the rigorous courses in the health science professional schools (Martin et al, 1983).

The original name for the program was Supplemental Course Instruction. Several years late the name was shortened to Supplemental Instruction. This has been the predominant name of choice by 95% of U.S. institutions (Arendale, 2000). The name was never meant to imply that additional knowledge or instruction was to be supplied by the SI leader. SI sessions have always been structured to review what was presented in the previous class lectures and assigned material from the textbook. The UMKC SI staff has considered other names, but they decided to stay with SI since it had such a large body of professional literature. However, other names have been used outside the U.S. due to political or practical reasons. In the United Kingdom (UK) the more common term is Peer Assisted Learning (PAL). This name was used since it avoided the appearance that SI was a competing form of instruction with the institution's full-time faculty and staff members. At most UK institutions there are full-time professional tutors who work closely with the course instructors in the delivery and review of the content material. SI had to be carefully positioned so as not to seem to compete with the professional tutors. Deanna Martin met with national education labor representatives to clarify the role of the SI program and how it enabled students to be more prepared for the tutorial services and class lectures. Even after these informal negotiations were resolved to the satisfaction to all parties, the name of the program was still potentially confusing. The UK educators who were interested in SI developed an alternative name for the program, PALs (J. Wallace, personal communication, July 16, 2001). In Australia the term of choice by many who have implemented the SI program is Peer Assisted Study Sessions (PASS). Both PALs and PASS emphasize the fellow student collaborative focus of the groups. The choice of using the word learning in the PALs name reflects an important emphasis of what occurs during the study sessions.

As described earlier in this chapter, social change is more likely to occur as a practical response to specific events than as the implementation of a well-developed ideology. The choice to implement SI at the graduate and professional school level was made since that was the area identified by the UMKC retention committee and substantial grant funds were available. Beginning with students who most viewed as the most academically elite at the institution and providing an academic intervention that improved their academic performance brought tremendous credibility to the fledgling SI program. The status given to the SI program due to its success with the elite health science schools provided the credibility for its implementation with the undergraduate courses. Based on the elitist culture held by many UMKC faculty members, most of whom were holdovers from the UKC era, if SI had first been implemented with first-year classes the program might have never been used with the graduate and professional schools who often viewed their students as different and better than the rest of the institution. It would have been easy for many faculty members to have dismissed SI as something designed for less able students and not appropriate for the premiere, highly selective students. Part of the

universal appeal of the SI program is the academic improvement for students from a wide range of academic ability levels and course content areas.

A chance meeting in Washington, D.C. during 1978 was pivotal for eventual national and international dissemination of the SI model. Up to this point the SI program prospered on the UMKC campus and information about it had been shared through several conference presentations, individual consultations, and a self-produced manual eventually made available through ERIC (Martin, Lorton, Blanc, & Evans, 1977). A few schools in the Midwest had started their own pilot SI programs. At a federally-sponsored elementary and secondary education conference held in Washington, D.C., Deanna Martin and Clark Chipman met and talked about SI. Chipman was a regional administrator for the U.S. Department of Education (USDOE) with responsibility for higher education programs. He was very interested in education programs that promoted academic achievement for college students, especially those from first-generation and academically or economically disadvantaged backgrounds. After their short meeting in D.C., Chipman arranged to meet with Martin while he was in Kansas City for another event the following month. During their lunch meeting in Kansas City both shared their interests in helping address the attrition problem for higher education students. Martin talked about the application of Piaget's learning theory for college students. Chipman shared her enthusiasm and encouraged Martin to learn more about the National Diffusion Network (NDN) under the Office of Educational Research and Improvement of USDOE (C. Chipman, personal communication, August 27, 2001).

The NDN was a nationwide system created in 1974 with a modest $14 million annual budget to improve American education through the implementation, in local schools and other settings, of rigorously evaluated, effective education programs. Developer Demonstrators (DDs) are locally developed effective educational projects validated by a federal panel of program evaluation experts. Approximately 450 DDs were validated by the NDN over a period of twenty years, of which approximately 25% received USDOE funds to nationally disseminate their programs through training workshops, awareness presentations, publications, and technical assistance. NDN validated programs were used by nearly five million school children annually in 80,000 classrooms in 32,000 U.S. schools Rather than requiring each school to "reinvent the wheel," the NDN sought to validate locally-developed practices and provide funds for national dissemination. The estimated investment to develop an NDN practice was $400,000 while the cost to adopt the practice by another school was approximately $1,000 (National Diffusion Network, 1993).

Chipman encouraged Martin to collect data and submit an evaluation study for review of the Joint Dissemination Review Panel (JDRP) of the NDN to seek validation as an Exemplary Educational Program and to become a DD. The JDRP was the program evaluation unit within NDN. This designation by NDN for USDOE would be critical for attracting more national attention since it was an external validation of the efficacy of the SI program for improving student achievement. It would also permit the SI program to

seek funding from USDOE supporting national dissemination of the program to other peer institutions in the U.S.. Three areas were evaluated by the JDRP: convincing results of effectiveness, appropriate and rigorous program evaluation design, and potential for replication at other institutions (Ralph & Dwyer, 1988). UMKC submitted data from its own program and also several other colleges that had implemented pilot SI program as well. UMKC has collected SI research data from nearly 300 institutions in 7,500 classes with a combined enrollment of nearly a half million students. These research studies continue to replicate earlier research studies (Arendale, 1999).

In 1981 the SI program received its certification as an Exemplary Educational Program from JDRP. The SI program received validation under two outcome areas. Claim Type 1 was for improved academic achievement. This was demonstrated by higher final course grades by SI participants in the targeted classes. Claim Type 2 was for improved student attitude and behaviors. This was demonstrated by lower withdrawal rates from the targeted classes and higher rates of persistence toward graduation by the SI participants.(S. Rubak, personal communication, December 10, 1981). SI was the first program certified by the USDOE as contributing to increased student academic achievement and persistence toward graduation of college students. The SI program was reevaluated and successfully recertified by the JDRP and its successor, the Program Effectiveness Panel (PEP), in 1985, 1988, and 1992. Due to federal budget cuts during the mid 1990s under the Clinton Administration, the NDN and the PEP was eliminated and so were opportunities for recertification and funding for dissemination activities from USDOE.

While many SI-related publications have been written by staff from UMKC, a major article was published in 1983 that would prove critical for future dissemination activities. The Journal of Higher Education in that year published Breaking the Attrition Cycle: The Effects of Supplemental Instruction on Undergraduate Performance and Attrition (Blanc, DeBuhr, & Martin, 1983). This article gained public and professional attention for the SI program outside the circle of developmental education.

In 1984 federal funds were provided through the NDN to support national dissemination of the SI model to other campuses. The initial application to NDN was not funded in 1982. Clark Chipman continued to monitor the SI program at UMKC and learned of the funding decision from Martin. Chipman followed up with the Lee Wickline, NDN Director, after this initial funding refusal. Part of the reason cited by Wickline for denying the funding was that the NDN had focused its funding priority on education practices at the elementary and secondary level since there were few NDN approved higher education DDs. Chipman then contacted Gary Jones, Undersecretary of Education, about this incongruity between NDN authorization to apply for funding and a lack of funding authority for higher education program. Within an hour of the conversation with Jones, Chipman received a telephone call from Wickline assuring that a critical review of NDN approved higher education proposals would occur during the next

funding cycle. The first year of NDN funding for SI dissemination to UMKC was provided in 1984 (C. Chipman, personal communication, August 27, 2001).

Until the NDN agency demise due to federal budget cutbacks by the Clinton Administration that recommended its elimination in the mid 1990s, USDOE provided nearly $800,000 to UMKC over a decade to support national dissemination. When federal funds were cut, UMKC raised the revenue necessary to continue national and international dissemination by charging moderate fees for attendance at the three-day SI Supervisor Workshops that are held by the University nine times each year in Kansas City with many other ones conducted around the U.S. and in other countries. May Garland from the Center directed the early dissemination efforts and managed the USDOE grant. Garland was followed by Mary Gravina, Dr. Kim Wilcox, and now the national training and research efforts are directed by Dr. Sydney Stansbury.

To expand efforts by UMKC staff with dissemination efforts, a group of Certified Trainers (CTs) were established. The CTs were invited by the UMKC staff to conduct SI Supervisor training workshops and provide consulting services to institutions in their geographic area. Each CT had already established a thriving SI program on their home campus and had institutional support to help other colleges to successfully implement SI. To date, a dozen faculty members or administrators from institutions in the U.S. and colleagues from Australia, Mexico, South Africa, Sweden, and the United Kingdom have been selected for both this honor and service. Each was selected for their expertise and area of interest. For example, Dr. Julia Visor from Illinois State University (Normal, IL) has enriched the SI network through her skill with SI as it is combined with knowledge of TRIO programs and expertise with research, especially in affective domain variables. The first CT outside the U.S. was Jenni Wallace from the United Kingdom (UK) who has combined her expertise of SI along with institutional quality measurement and instructional improvement. Through her leadership, nearly fifty UK institutions have implemented SI and the UK SI Network hosts annual SI Leader and SI Supervisor conferences.

To date, faculty and staff from more than 860 institutions in the United States and an additional 165 institutions in 12 countries have attended SI Supervisor training workshops. On average approximately fifty new institutions are trained each year to start their own SI program. The first institution to implement the SI program and continue to operate was established in 1979 at Bethel College in North Newton, KS. It was started by Dr. Sandra Zerger, later to be selected as a CT, who received permission from the USDOE to revise a recently awarded Title III Strengthening Institutions grant by redirecting funds from a tutoring center and instead fund a pilot SI program. Since formal training workshops and curriculum materials had yet to be established, Deanna Martin and staff from UMKC drove over to Bethel College, located in central Kansas, and consulted with Zerger as the pilot SI program was started (S. Zerger, personal communication, August 29, 2001).

It is estimated that more than a quarter million students participate in SI during each academic term. Approximately 450 professional articles, research studies, conference

proceedings, and other forms of media have been written about SI by staff from the SI Center at UMKC and other SI administrators and scholars from around the world (Arendale, 1999).   Research studies have consistently replicated the findings that SI is a cost-effective program that contributes to increased academic achievement, persistence, and graduation rates (Martin & Arendale, 1993).   A wealth of information about SI is available at its website, http://www.umkc.edu/cad/si/

Overview of Supplemental Instruction

SI is a student academic assistance program that increases academic performance and retention through its use of selected collaborative learning and study strategies. The SI program targets traditionally difficult academic courses, those that typically have 30 percent or higher rate of D or F final course grades and course withdrawals (e.g., algebra, chemistry, anatomy). SI provides regularly scheduled, out-of-class, peer-facilitated sessions that offer students an opportunity to discuss and process course information (Martin et al., 1977).

SI sessions are extensions of the classroom where students continue the learning process initiated by the professor (Wilcox, 1995). Rather than being limited by the prescribed classroom time, students can attend SI sessions as often as they want throughout the academic term to receive the assistance that they need and to engage in intellectual inquiry. Students receive continuous feedback regarding their comprehension of the classroom material, thereby giving them opportunity to modify their study behaviors before major examinations are administered by the professor. Immediate feedback received during SI sessions enables students to quickly modify study behaviors to adapt to the academic rigor and requirements of the course. Many students respond to SI because they perceive that their need for academic assistance is met in the sessions (Martin, 1980). Professors participate in the SI program at the level that they choose. Some faculty members report significant professional development opportunities for themselves that are described later in this chapter.

Assistance begins in the first week of the term. The SI leader, a former successful student of the same class, introduces the program during the first class session and surveys the students to establish a schedule for the SI sessions. Attendance is voluntary. Students of varying abilities participate, and no effort is made to segregate students based on academic ability. Many academically underprepared students who might otherwise avoid seeking assistance will participate in SI as it is not perceived to be remediation and there is no potential stigma attached (Martin & Blanc, 1981). Such unintended stigmas can cause motivation problems for developmental students (Somers, 1988).

SI sessions provide a way to integrate "what to learn" with "how to learn." SI allows students to develop the needed learning strategies while they are currently enrolled in college degree credit courses. SI avoids the remedial stigma often attached to traditional

academic assistance programs as it does not identify "high-risk students" but identifies "historically difficult classes." SI is open to all students in the targeted course; therefore, prescreening of students is unnecessary. The SI program begins the first week of the academic term. This allows the program to provide academic assistance during the critical initial six-week period of class before nearly all students face their first major examination. Attrition is highest during this period (Noel, Levitz, Saluri, & Associates, 1985).

SI focuses on historically difficult courses. Historically difficult courses often share the following characteristics: large amounts of weekly readings from both difficult textbooks and secondary library reference works, infrequent examinations that focus on higher cognitive levels of Bloom's taxonomy (Bloom, 1982), voluntary and unrecorded class attendance, and large classes in which each student has little opportunity for interaction with the professor or the other students. Some researchers (e.g., Christie & Dinham, 1991) have concluded that it is difficult to rely solely upon the analysis of high school grades and standardized college entrance examination scores to accurately identify all students who will withdraw from college. Less than 25% of all students who drop out of college were involuntarily dismissed by their institution for failure to meet minimum academic performance standards such as a sufficient cumulative grade point average (Tinto, 1993). Many leave the institution due to extreme difficulty and frustration in high risk courses (Noel, et al., 1985).

Designating a course as historically difficult makes no prejudicial comment about the professor or the students. It is a numerical calculation that suggests many students have difficulty in meeting academic requirements for the class. Rather than blaming the students or the professor, the designation suggests that additional academic support is needed for students to raise their level of academic performance to meet the level deemed appropriate by the classroom professor. In recent years, the popular and professional literature has been replete with extensive discussions about who is at fault for the perceived lower quality of student academic achievement. SI bypasses this issue and provides a practical solution that helps students meet or exceed the professor's level of expectation.

In recent years, several new objectives for SI have been implemented. One is its use as a follow-up to First-Year Experience courses. The SI program is uniquely suited to serve as a companion of a campus First Year Experience Program because it: provides immediate application of learning strategies to content courses; encourages formation of learning communities composed of students who seek higher academic achievement; addresses common factors in student attrition; and meets or exceeds academic expectancy levels of historically difficult first-year courses (Martin & Arendale, 1993). SI is an excellent follow-up activity for students who have participated in first-year experience programs.

A challenge for first-year student programs that are conducted before the beginning of the academic term is that they often rely on lectures concerning study strategies. These instructional sessions are usually isolated from the actual content material in college courses. Students often feel frustrated when faced with abstract lectures concerning study

skill instruction that is dissociated from college content material. Rather than seeing the need for such instruction, many students associate study skill strategy review as appropriate for "other students," those who need remedial or developmental assistance. Students perceive a vested interest in study skill strategies when the skills are directly applied to content courses that the students are currently taking. Faced with an impending exam, students are receptive when they might otherwise be uninterested.

Besides helping students to increase their retention and understanding of course material, the SI program has been effectively used for faculty development and renewal. Faculty can choose to do one or more of the following: adopt strategies used in the SI sessions during regular class time; receive informal feedback from the SI sessions concerning what the students understand and need additional assistance; and learn new strategies as they serve as mentors to the SI program student leaders. Additional benefits mentioned by Australian faculty members include: increased rapport with students, membership in national and international SI network, increased recognition from their colleagues, additional opportunities to obtain grant funds, and increased satisfaction with their teaching role (Gardiner, 1996).

Contribution of Supplemental Instruction to Developmental Education

SI provides another paradigm to the field of developmental education for academic assistance to students. The shift from focusing on a targeted subpopulation of at-risk students to a broader range of students enrolled in historically difficult courses established another precedent for mainstreaming the best practices of developmental education with a wide range of students throughout the institution. This foreshadowed the current focus on many campuses with creating an enriched learning environment for all students.

The Hierarchy of Learning Improvement Programs (Keimig, 1983) provides a conceptual framework for SI. Keimig differentiated education programs based on two criteria: the comprehensiveness of the program and the degree to which the program was institutionalized into the overall academic delivery system. Highly effective programs were not isolated, but were integrated into the heart of the institution. From lowest to highest, the four levels of programs in Keimig's hierarchy were: isolated courses in remedial skills, tutorial assistance to individual students, course-related supplemental learning activities, and college courses that have been significantly changed and have comprehensive learning systems built into them.

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Using Keimig's model, programs similar to SI were ranked near the top of the effectiveness scale since

> . . . students' learning needs are presented as being necessary because of the nature of the objectives and content of the course rather than because of students' deficiencies. Therefore, all students have access to supplementary . . . instructional experiences which benefit nonremedial students as well. (Keimig, 1983, p. 23)

Keimig's description of the highest level of program in the hierarchy, the comprehensive learning system, was reserved for classes where the class instructional delivery system has been significantly changed by integration of affective domain needs, learning skills, prerequisite knowledge, and cognitive mastery outcomes. UMKC developed its version of this level of program with the creation of Video-based Supplemental Instruction (VSI) in the early 1990s (Martin & Blanc, 1994).

Another way to look at the paradigm offered by SI is though an analogy of comparing a traditional medical model of treating a patient as opposed to a community health model that makes systematic changes in the environment that positively influences all individuals (Martin et al., 1977). Traditional individual tutorial practices during the time that SI was created in 1973 may be described as following a medical model: an individual is identified as needing professional assistance based on prior academic performance and diagnostic testing; self-referral in response to perceived symptoms; or referral by another professional in response to observed symptoms. The developers at UMKC found that several assumptions of the medical model either did not apply or were not practiced in their institution.

The traditional model relies on identification of the high-risk student, the student who is deemed to be deficient or at-risk in some way. Such pre-matriculation identification was very difficult. First, entering students must be known to the faculty and staff in time for key personnel to establish contact with at-risk students. Second, it must be noted in this context that neither prior performance nor standardized testing is sufficiently reliable as a prediction criterion of who is and is not at risk. As many as 50% of those whose prior scores suggest they are at risk prove to be successful without intervention, and many of those who are not identified in this manner prove to be unsuccessful (Martin & Blanc, 1981). Analysis of high school grades and standardized college entrance examinations do not identify all students who will drop out of college for academic reasons (Blanc et al., 1983; Christie & Dinham, 1991; Martin, Blanc, DeBuhr, Alderman, Garland, & Lewis, 1983; Tinto, 1993).

Attrition cannot be addressed effectively by providing help only to those students who show either symptoms or predisposing weaknesses. The treatment must be more generalized, and the problem must be addressed at or near its source: the mismatch between the level of instruction and the level of student preparation (Martin et al., 1977). Timely identification of students who are at risk is difficult. Faculty who can refer students for corrective instruction are rarely able to make a referral before the scoring of the first course examination. Students who are referred after that time are at

considerable disadvantage, trying to catch up with the class after a very poor start. The rate of student attrition across courses is greatest in the first six weeks or after the first exam when students may find their grades disappointing (Blanc et al., 1983; Noel et al., 1985). Students who are at risk are among those least compliant with faculty recommendations for special help, whether for personal counseling or for academic assistance. Such students often perceive that tutorial help, far from relieving them of their academic burden, increases the burden as they must now answer to a tutor besides the course professor. Finally, students who are at risk are notorious for their reluctance to refer themselves for assistance until much too late. Whether through denial, pride, or ignorance, students who need help the most are least likely to request it. So goes the axiom of the learning assistance trade (Somers, 1988).

Rather than pursuing the traditional medical model, the SI program is more analogous to a community health model. In this model, the focus is shifted from individuals to the environment in which they live and work. An example of this shift is the widespread use of free or reduced cost inoculations against childhood diseases. It was less expensive and more effective for all children to receive the inoculations than to spend enormous amounts of public tax dollars treating the diseases that would come later to a few individuals.

The community health model requires the policymakers to make changes in the living environment rather than placing the responsibility or blame upon the individuals. This shift eliminates blame from anyone and instead puts the focus on developing a systemic solution that is proactive before problems occur. In reviewing research from Steele (1997), he has identified the harmful effects of negative stereotyping upon African-American students. An enriched and supportive learning environment for all students is preferable to arbitrary activities that cohort students based on race or previous academic achievement. Steele's research stated that,

> . . . in school domains where these groups are negatively stereotyped, those who have become domain identified face the further barrier of stereotype threat, the threat that others' judgments or their own actions will negatively stereotype them in the domain. (Steele, 1997, p. 613)

SI avoids the stereotype threat by offering a service to all students in the class rather than attempting to predict which students will need to attend. Students who are negatively stereotyped generally perform academically more poorly than if the stereotype was not promoted either directly or indirectly by the institution and the academic culture that it creates. SI is a systematic program for the learning environment rather than a treatment for identified individuals.

A conscious decision was made to base the SI model on a developmental perspective because that places the burden of responsibility on the service providers. Such a theory base assumes that the students will learn if the conditions for learning are in place. The leading researcher in the developmental field at the time the SI model was created was Jean Piaget (Piaget & Inhelder, 1958). Robert Blanc is to be credited with anchoring SI

in a developmental framework and designing original research studies (Blanc et al., 1983; Martin et al., 1977).

Summary

Supplemental Instruction is another vehicle for delivering the best practices of developmental education into the mainstream of the higher education teaching and learning. As U.S. higher education continues to increase opportunity and access for historically underrepresented student groups, the need for developmental education will continue to increase. Developmental education will need to continually evolve using new emerging theories of learning and research-based practices to meet the practical education needs of students and the pragmatic political environment in which it must operate.

The concurrent development of "what to know" with "how to know it" using the SI methodology was a unique innovation at the time of its creation. Initially designed for academic support of students, the program has blossomed in new, unanticipated areas. In recent years the SI program has spread to more than a dozen countries outside the U.S. Many of these SI programs report the utility of SI for professional development of classroom professors and the SI leader themselves. With the arrival of distance learning programs, there is an expectation of providing student services on-line. With the current focus on providing learning communities throughout higher education institutions, increased attention has been placed on SI programs as they compliment and support student learning for a wider range of students in classes that may not be historically-difficult. More educators see SI as an enrichment program for all students to help them more deeply master rigorous content material.

It has been nearly three decades since SI first appeared in higher education. After starting at UMKC in 1973, SI has been implemented at approximately 1,000 colleges in the U.S. and a dozen countries. As new theories of learning have emerged, the SI model has incorporated the best into the evolving model. SI is flexible to meet the learning needs of students and complement an enriched learning environment managed by the classroom professor. It extends the classroom learning environment and manages student study time to maximize its use in mastering difficult course content. SI is a valuable partner to increase the efficiency and effectiveness of learning.

References

Arendale, D. (1999). Annotated bibliography of Supplemental Instruction and Video-based Supplemental Instruction. Unpublished manuscript, Center for Supplemental Instruction, The University of Missouri-Kansas City.

Arendale, D. (2000). Effect of administrative placement and fidelity of implementation of the model of effectiveness of Supplemental Instruction programs. Unpublished doctoral dissertation, University of Missouri-Kansas City, Kansas City, MO.

Blanc, R., DeBuhr, L., & Martin, D. C. (1983). Breaking the attrition cycle: The effects of Supplemental Instruction on undergraduate performance and attrition. Journal of Higher Education, 54(1), 80-89.

Bloom, B. (1982). Human characteristics and school learning. New York: McGraw-Hill.

Brier, E. (1984). Bridging the academic preparation gap: An historical view. Journal of Developmental Education, 8(1), 2-5.

Carman, R. A. (1970). Systems analysis of a learning resource center. Unpublished manuscript, University of California, Los Angeles (ERIC Document Reproduction Service No. ED 035 411).

Casazza, M. E., & Silverman, S. L. (1996). Learning assistance and developmental education: A guide for effective practice . San Francisco: Jossey-Bass.

Chafe, W. H. (1991). The paradox of change: American women in the 20th century. New York: Oxford University Press.

Christ, F. L. (1971). Systems for learning assistance: Learners, learning facilitators, and learning centers. In Fourth annual proceedings of the Western College Reading Association, Volume IV: Interdisciplinary aspects of reading instruction (pp. 32-41). Los Angeles: Western College Reading Association.

Christ, F. L. (1997). The Learning Assistance Center as I lived it. In S. Mioduski, & G. Enright (Eds.), Proceedings of the 15th and 16th annual institutes for learning assistance professionals: 1994 and 1995 (pp. 1-14). Tuscon, AZ: University Learning Center, University of Arizona.

Christie, N. G., & Dinham, S. M. (1991). Institutional and external influences on social integration in the freshman year. Journal of Higher Education, 62(4), 412-436

Cross, K. P. (1976). Accent on learning. San Francisco: Jossey-Bass.

Ellison, J. (1973). The concept of college and university learning resource centers. (ERIC Document Reproduction Service No. ED 077 229)

Enright, G. (1975). College learning skills: Frontierland origins of the learning assistance center. In Proceedings of the Eighth Annual Conference of the Western College Reading Association: College Learning Skills Today and Tomorrow (pp. 81-92). Las Cruces, NM: Western College Reading Association. (ERIC Document Reproduction Service No. ED 105 204).

Gardiner, R. (1996). Supplemental Instruction: A cost-effective, student-centered collaborative learning program. Proceedings of the Second International Open Learning

Conference (pp. 214-219). Brisbane, Queensland, Australia: International Open Learning Conference.

Henderson, D. D., Melloni, B. J., & Sherman, J. G. (1971). What a learning resource center (LRC) could mean for Georgetown University. Unpublished manuscript. (ERIC Document Reproduction Service No. ED 055 417)

Hultgren, D. D. (1970). The role of the individual learning center in effecting educational change. In G. B. Schick & M. M. May (Eds.), Reading: Process and pedagogy. 19th National Reading Conference Yearbook, Volume 2 (pp. 89-94). Milwaukee, WI: National Reading Conference.

Keimig, R. T. (1983). Raising academic standards: A guide to learning improvement. ASHE-ERIC Higher Education Report No. 4. Washington, D.C.: Association for the Study of Higher Education.

Kerstiens, G. (1972). The ombudsman function of the college learning center. In F. Greene (Ed.), College reading: Problems and programs of junior and senior colleges. 21st National Reading Conference Yearbook, Volume 2 (pp. 221-227). Milwaukee, WI: National Reading Conference.

Lissner, L. S. (1990). The learning center from 1829 to the year 2000 and beyond. In R. M. Hashway (Ed.), Handbook of developmental education (pp. 127-154). New York: Praeger.

Martin, D. C. (1980). Learning centers in professional schools. In K. V. Lauridsen (Ed.), Examining the scope of learning centers (pp. 69-79). San Francisco: Jossey-Bass.

Martin, D. C., & Arendale, D. (1993). Supplemental Instruction: Improving first-year student success in high-risk courses (2nd ed.). Columbia, SC: National Resource Center for the First Year Experience and Students in Transition (ERIC Document Reproduction Service No. ED 354 839)

Martin, D. C., & Blanc, R. (1981). The learning center's role in retention: Integrating student support services with departmental instruction. Journal of Developmental and Remedial Education, 4 (3), 2-4.

Martin, D. C., & Blanc. R. (1994). Video-based Supplemental Instruction: A pathway for mastery and persistence. In D. C. Martin, & D. Arendale (Eds.). Supplemental Instruction: Increasing achievement and retention (pp. 83-92). San Francisco: Jossey-Bass.

Martin, D. C., Blanc, R., DeBuhr, L., Alderman, H., Garland, M., & Lewis, C. (1983). Supplemental Instruction: A model for student academic support. Kansas City, MO: The University of Missouri-Kansas City and the ACT National Center for the Advancement of Educational Practices.

Martin, D. C., Lorton, M., Blanc, R., & Evans, C. (1977). The learning center: A comprehensive model for colleges and universities. Kansas City, MO: University of Missouri (ERIC Document Reproduction Service No. ED 162 294)

National Diffusion Network. (1993). Educational programs that work: The catalogue of the National Diffusion Network (NDN). (18th ed.). Longmont, CO: Sopris West.

Noel, L., Levitz, R., Saluri, D., & Associates. (1985). Increasing student retention: Effective programs and practices for reducing the dropout rate. San Francisco: Jossey-Bass.

Piaget, J. & Inhelder, B. (1958). Growth of logical thinking. New York: Basic Books.

Ralph, J. & Dwyer, M. C. (1988). Making the case: Evidence of program effectiveness in school and classrooms, criteria and guidelines for the U.S. Department of Education's Program Effectiveness Panel. Washington, D.C.: U. S. Department of Education, Office of Educational Research and Improvement.

Somers, R. L. (1988). Causes of marginal performance by developmental students. Boone, NC: National Center for Developmental Education, Appalachian State University.

Steele, C. M. (1997). A threat in the air: How stereotypes shape intellectual identity and performance. American Psychologist, 52 (6), 611-629.

Tinto, V. (1993). Leaving college: Rethinking the causes and cures of student attrition (2nd ed.). Chicago: The University of Chicago Press.

White Jr., W. G., Kyzar, B., & Lane, K. E. (1990). College learning assistance centers: Spaces for learning. In R. M. Hashway (Ed.), Handbook of developmental education (pp. 179-195). New York: Praeger.

White Jr., W. G., & Schnuth, M. L. (1990). College learning assistance centers: Places for learning. In R. M. Hashway (Ed.), Handbook of developmental education (pp. 155-177). New York: Praeger.

Widmar, G. E. (1994). Supplemental Instruction: From small beginnings to a national program. In D. C. Martin & D. R. Arendale (Eds.), Supplemental Instruction: Increasing achievement and retention (pp. 3-10). San Francisco: Jossey-Bass.

Wilcox, F. K. (1995). Supplemental Instruction and efficiency in learning. In M. T. Keeton, B. Mayo-Wells, J. Porosky, & B. Sheckley (Eds.), Efficiency in adult higher education: A practitioner handbook (pp. 102-107). College Park, MD: The University of Maryland University College, Institute for Research on Adults in Higher Education.

FIGURE 1
DIFFERENT PHASES OF DEVELOPMENTAL EDUCATION FOR
COLLEGE STUDENTS IN THE UNITED STATES
(Arendale, 2000)

Time Period	Name(s) Commonly Used With Activities	Students Predominantly Served During This Time Period
Mid 1600s to 1820s	Tutoring	Privileged White males
1820s to 1860s	Precollegiate preparatory academy and tutoring	Privileged White males
1860s to Mid 1940s	Remedial education classes within college preparatory programs and tutoring	Mostly White males
Mid 1940s to Early 1970s	Remedial education classes integrated within the institution, tutoring, and compensatory education	Traditional White male students, nontraditional males and females, and federal legislative priority groups: first-generation college, economically-disadvantaged, and students of color
Early 1970s to Mid 1990s	Developmental education, learning assistance, tutoring, and Supplemental Instruction	Previous groups listed above and an increase in older students who are returning to education or attending postsecondary education for first time
Mid 1990s to Present	Developmental education with expansion into enrichment activities, classes and programs	Previous groups listed above and an increase in number of general students who want to deepen mastery of academic content material

FIGURE 1 CAPTION
This figure describes the six phases of developmental education for college students in the United States since the mid 1600s. Each succeeding phase has included more students subpopulations that needed academic assistance at the post secondary level.

FIGURE 2
KEIMIG'S HIERARCHY OF LEARNING IMPROVEMENT PROGRAMS
(Keimig 1983)

Higher Potential for Improved Learning and Instructional Change

Level Four: Comprehensive Learning Systems
Level Three: Course-Related Learning Services
Level Two: Learning Assistance for Individual Students
Level One: Remedial Courses

Low Potential for Improved Learning and Instructional Change

FIGURE 2 CAPTION
This figure describes Keimig's Hierarchy of Learning Improvement Programs. Moving from bottom to top, each succeeding program level has a higher potential for improved learning and instructional change.